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Evidence from Owl Pellets Indicate that Prairie Voles (*Microtus ochrogaster*) are Broadly Distributed in the Texas Panhandle

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Abstract

To investigate the distribution of *Microtus ochrogaster* (Prairie Voles) in the Texas Panhandle, owl pellets were collected from 123 owl roosts in 27 counties. Remains of Prairie Voles were found at 76 roosts in 20 counties. Fifty-four of the roost sites (located in Briscoe, Castro, Deaf Smith, Floyd, Gray, Hale, Hartley, Hockley, Hutchinson, Lamb, Moore, Parmer, Randall, and Swisher counties) represent new county records for *M. ochrogaster* in Texas. Further, these data indicate that individuals and populations of *M. ochrogaster* in this region are more common than previously documented.

Key words: county records, *Microtus ochrogaster*, prairie vole, small mammals, Texas Panhandle

Introduction

Microtus ochrogaster (Prairie Vole) is a medium-size mouse that is widely distributed throughout the grasslands of the central United States (Stalling 1990). In the Oklahoma Panhandle and southwestern Kansas, *M. ochrogaster* occurs along riparian corridors, drainage routes, and related floodplains (Reed and Choate 1988). In western Oklahoma, skeletal remains of *M. ochrogaster* have been recovered from owl pellets collected in Ellis, Harmon, and Jackson counties (which border the Texas Panhandle), as well as from 11 other counties in western Oklahoma, resulting in an expansion of the known range in that state (McDonald et al. 2006).

Regarding the Texas Panhandle, Manning and Jones (1988) and Choate and Killebrew (1991) documented *M. ochrogaster* in Lipscomb and Hansford counties, respectively. More than 10 years later, two specimens of *M. ochrogaster* were captured in Carson County and skeletal remains were identified in owl pellets from Dallam and Sherman counties in the Texas Panhandle (McCaffery et al. 2003). Poole and Matlack (2007) reported the presence of *M. ochrogaster* in Armstrong, Carson, and Ochiltree counties based on skeletal remains found in owl pellets. Most recently, Roberts et al. (2015) reported a record of the Prairie Vole from Lubbock County, extending the range of the species approximately 150 km to the south. Based on these published reports, Schmidly and Bradley (2016) listed the documented range of the Prairie Vole to include Armstrong, Hansford, Lipscomb, and Lubbock counties in the Texas Panhandle.

Studies by Smith (1992) and Dalquest et al. (1990) in New Mexico, Oklahoma, and Texas suggested that livetrapping of *M. ochrogaster* in this portion of the prairie vole's range was difficult and they reported low rates of capture over many trap nights. Poole and Matlack (2007) suggested that populations of *M. ochrogaster* in the Panhandle region are ephemeral, also making sampling difficult. However, it is well known that owl pellets often offer insight into species of small mammals that are difficult to trap and owl pellets thereby offer a short-term archive of the small mammals in an area. For example, Wright et al. (2016) documented new county records of two genera of shrews (*Notiosorex* and *Cryptotis*) from the Texas Panhandle that were unknown prior to the examination of a series of owl pellets.

Herein, owl pellets were collected and skeletal remains analyzed from multiple locations across the Texas Panhandle. Owl pellets from these locations often were found in sheltered/protected locations (e.g., barns or silos); consequently, they represent an accumulation of material over a number of years. The species of owls observed roosting across these locations were the Barn Owl (*Tyto alba*) and the Great Horned Owl (*Bubo virginianus*).

METHODS AND MATERIALS

Owl pellets were collected from Armstrong, Bailey, Briscoe, Carson, Castro, Cottle, Dallam, Deaf Smith, Donley, Floyd, Gray, Hale, Hall, Hansford, Hartley, Hockley, Hutchinson, Lamb, Lipscomb, Moore, Ochiltree, Oldham, Parmer, Randall, Sherman, Swisher, and Wheeler counties in the Panhandle of Texas. Cottle County is a peripheral county of the Texas Panhandle and Rolling Plains regions. Pellets were dissolved in an 8% NaOH (sodium hydroxide) solution for 20–24 hours to remove hair and release skeletal material from the tightly bound pellet. Skeletal material was rinsed with water in a sieve and air dried for 24–48 hours. Individuals of *M. ochrogaster* were identified to species by cranial and dental characteristics (Elbroch 2006). Manning and Jones (1988), Choate and Killebrew (1991), McCaffrey et al. (2003), Poole and Matlack (2007), and Schmidly and Bradley (2016) were referenced to determine distribution within the known range of *M. ochrogaster* and new county records. All specimens obtained in the study were deposited in the Natural Science Research Laboratory, Museum of Texas Tech University (see Appendix).

RESULTS

Approximately 3,911 complete and numerous partial owl pellets and scattered skeletal remains were collected near 123 owl roosts in 27 counties in the Texas Panhandle. Remains of *M. ochrogaster* (skulls or jaws; 648 specimens) were identified at 76 roosts in 20 counties. Of these, Briscoe, Castro, Deaf Smith, Floyd, Gray, Hale, Hartley, Hockley, Hutchinson, Lamb, Moore, Parmer, Randall, and Swisher counties represent new county records for the Prairie Vole in Texas (Fig. 1 and Appendix).

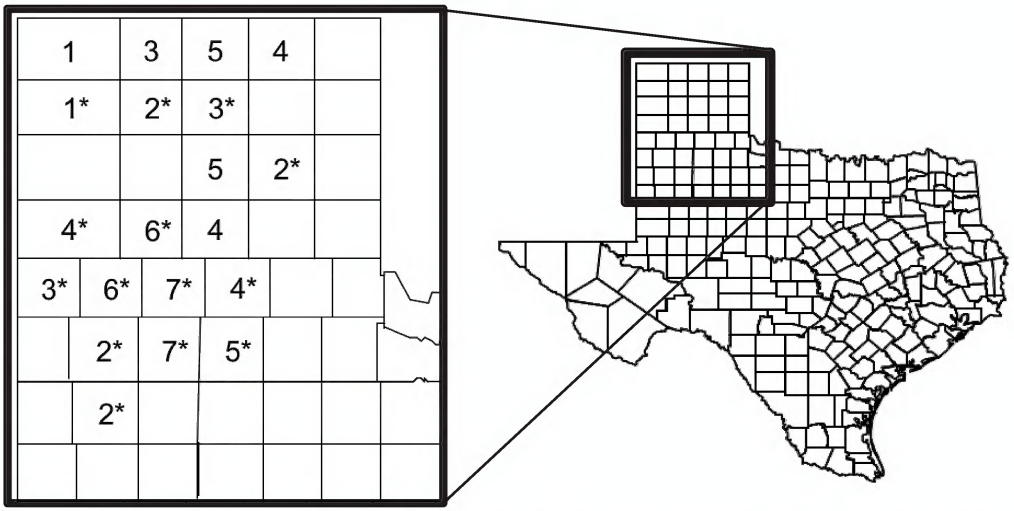

Figure 1. Location of owl roosts surveyed in the Texas Panhandle. The numbers placed within a county indicate the number of owl roosts wherein remains of *Microtus ochrogaster* were discovered. Refer to the Appendix for additional details and localities within counties. An asterisk (*) denotes county records for the species.

DISCUSSION

Prior to this study, *M. ochrogaster* was known to occur only in a few counties in the northern and north-central portions of the Texas Panhandle, with a single record from south of the Panhandle in Lubbock County (Manning and Jones 1988; Choate and Killebrew 1991; McCaffrey et al. 2003; Poole and Matlack 2007; Roberts et al. 2015; Schmidly and Bradley 2016). Remains of *M. ochrogaster* obtained from owl pellets indicate that the species is broadly distributed and perhaps common in the western and central portions of Texas Panhandle. The new information discovered in this study supports the statement of Schmidly and Bradley (2016) that *M. ochrogaster* may be expanding its range in Texas. This theory is supported by previous studies conducted in 1987 through 2015 that reported few accounts of *M. ochrogaster* throughout the Texas Panhandle via trapping and the examination of owl pellets (Jones et al. 1987, 1988; Pesaturo 1989; Manning and Jones 1990; Goetze et al. 1991; Yancey et al. 1998; Lockwood and Jones 2000; Jones et al. 2015). Additional sampling of owl pellets in eastern New Mexico and additional portions of Texas, including the eastern Panhandle and areas to the south and east, is needed to better understand the distribution of the prairie vole in this portion of their range. In this regard, collection and examination of owl pellets offers an efficient method for surveying small mammal communities and providing distributional data for lesser-known species.

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APPENDIX

Microtus ochrogaster specimens collected in this study are reported below. Counties are listed alphabetically and are followed by number of specimens per county (in parentheses). This is followed by the number of specimens per locality, latitude/longitude data, and Museum of Texas Tech University catalog number (in parentheses).

Specimens examined.—Armstrong County (15): 8, 35°06'14.0"N, 101°34'04.0"W (TTU-M 150618–150625); 2, 35°06'20.0"N, 101°28'51.0"W (TTU-M 150626–150627); 3, 34°59'40.6"N, 101°20'21.5"W (TTU-M 150628–150630); 2, 35°02'25.2"N, 101°22'06.1"W (TTU-M 150631–150632).

Briscoe County (32): 3, 34°42'22.8"N, 101°26'29.7"W (TTU-M 150633–150635); 4, 34°28'46.0"N, 101°23'42.5"W (TTU-M 150636–150639); 18, 34°24'17.2"N, 101°26'07.7"W (TTU-M 150640–150657); 7, 34°27'53.8"N, 101°13'00.9"W (TTU-M 150658–150664).

Carson County (58): 9, 35°12'07.6"N, 101°15'30.8"W (TTU-M 150665–150673); 12, 35°15'45.7"N, 101°14'59.6"W (TTU-M 150674–150685); 22, 35°26'31.8"N, 101°16'48.4"W (TTU-M 150686–150707); 4, 35°19'27.8"N, 101°17'34.2"W (TTU-M 150708–150711); 11, 35°20'29.1"N, 101°14'24.4"W (TTU-M 150712–150722).

Castro County (76): 2, 34°20'50.0"N, 102°18'05.0"W (TTU-M 150723–150724); 5, 34°22'31.0"N, 102°18'14.0"W (TTU-M 150725–150729); 29, 34°42'11.5"N, 102°00'51.9"W (TTU-M 150730–150758); 3, 34°41'16.5"N, 102°09'32.1"W (TTU-M 150759–150761); 36, 34°41'19.2"N, 102°12'11.1"W (TTU-M 150762–150797); 1, 34°33'25.9"N, 102°14'29.4"W (TTU-M 150798).

Dallam County (2): 2, 36°09'14.7"N, 102°26'08.7"W (TTU-M 150799–150800).

Deaf Smith County (20): 9, 34°54'34.0"N, 102°19'53.0"W (TTU-M 150801–150809); 7, 34°45'23.4"N, 102°31'06.3"W (TTU-M 150810–150816); 2, 34°47'02.5"N, 102°30'50.1"W (TTU-M 150817–150818); 2, 35°06'34.3"N, 102°12'08.6"W (TTU-M 150819–150820).

Floyd County (28): 4, 34°12'49.9"N, 101°26'01.1"W (TTU-M 150821–150824); 11, 34°07'29.7"N, 101°25'51.4"W (TTU-M 150825–150835); 2, 33°58'33.6"N, 101°28'29.2"W (TTU-M 150836–150837); 4, 33°52'49.8"N, 101°30'51.1"W (TTU-M 150838–150841); 7, 34°04'55.6"N, 101°17'49.2"W (TTU-M 150842–150848).

Gray County (9): 2, 35°23'59.6"N, 100°58'07.7"W (TTU-M 150849–150850); 7, 35°19'44.2"N, 101°03'11.1"W (TTU-M 150851–150857).

Hale County (54): 16, 34°14'59.2"N, 101°39'21.3"W (TTU-M 150858–150873); 11, 33°56'30.7"N, 101°41'42.7"W (TTU-M 150874–150884); 5, 33°52'01.5"N, 101°44'10.2"W (TTU-M 150885–150889); 8, 33°52'37.8"N, 101°50'47.1"W (TTU-M 150890–150897); 2, 33°55'54.2"N, 102°00'41.1"W (TTU-M 150898–150899); 8, 34°04'01.1"N, 101°55'24.9"W (TTU-M 150900–150907); 4, 34°12'00.2"N, 102°05'03.7"W (TTU-M 150908–150911).

Hansford County (55): 1, 36°08'21.9"N, 101°12'43.7"W (TTU-M 150912); 3, 36°11'57.8"N, 101°07'41.2"W (TTU-M 150913–150915); 2, 36°19'27.9"N, 101°16'27.2"W (TTU-M 150916–150917); 11, 36°20'36.1"N, 101°31'03.5"W (TTU-M 150918–150928); 38, 36°17'02.2"N, 101°31'53.9"W (TTU-M 150929–150966).

Hartley County (2): 2, 36°01'40.1"N, 102°17'37.8"W (TTU-M 150967–150968).

Hockley County (8): 6, 33°47'13.0"N, 102°13'39.0"W (TTU-M 150969–150974); 2, 33°46'13.0"N, 102°13'37.0"W (TTU-M 150975–150976).

Hutchinson County (56): 31, 35°56'56.5"N, 101°27'32.0"W (TTU-M 150977–151007); 13, 36°01'21.1"N, 101°19'09.1"W (TTU-M 151008–151020); 12, 35°59'17.2"N, 101°13'08.2"W (TTU-M 151021–151032).

Lamb County (7): 4, 33°55'37.2"N, 102°12'23.7"W (TTU-M 151033–151036); 3, 34°14'03.5"N, 102°31'35.8"W (TTU-M 151037–151039).

Moore County (34): 19, 35°52'14.0"N, 101°57'02.0"W (TTU-M 151040–151058); 15, 35°53'32.9"N, 101°39'07.1"W (TTU-M 151059–151073).

Ochiltree County (69): 3, 36°11'16.6"N, 100°49'12.4"W (TTU-M 151074–151076); 45, 36°16'57.5"N, 100°43'43.9"W (TTU-M 151077–151121); 20, 36°23'02.6"N, 100°43'25.7"W (TTU-M 151122–151141); 1, 36°11'39.8"N, 100°53'31.3"W (TTU-M 151142).

Parmer County (10): 1, 34°43'08.0"N, 102°32'30.0"W (TTU-M 151143); 3, 34°38'28.6"N, 102°48'15.6"W (TTU-M 151144–151146); 6, 34°31'32.7"N, 102°43'56.3"W (TTU-M 151147–151152).

Randall County (52): 2, 35°06'47.0"N, 101°44'02.0"W (TTU-M 151153–151154); 16, 34°54'31.7"N, 101°58'24.3"W (TTU-M 151155–151170); 9, 34°51'12.1"N, 101°53'06.0"W (TTU-M 151171–151179); 14, 34°50'05.6"N, 101°53'22.92"W (TTU-M 151180–151193); 4, 34°47'08.8"N, 102°00'35.2"W (TTU-M 151194–151197); 7, 34°47'32.0"N, 101°48'07.5"W (TTU-M 151198–151204).

Sherman County (12): 2, 36°10'56.4"N, 101°45'06.8"W (TTU-M 151205–151206); 3, 36°19'38.2"N, 101°44'33.2"W (TTU-M 151207–151209); 7, 36°19'39.8"N, 101°48'07.4"W (TTU-M 151210–151216).

Swisher County (49): 3, 34°31'41.3"N, 101°55'57.6"W (TTU-M 151217–151219); 4, 34°37'44.8"N, 101°45'28.2"W (TTU-M 151220–151223); 12, 34°38'45.3"N, 101°37'00.6"W (TTU-M 151224–151235); 2, 34°32'05.7"N, 101°35'34.9"W (TTU-M 151236–151237); 4, 34°27'46.8"N, 101°33'50.0"W (TTU-M 151238–151241); 12, 34°25'29.4"N, 101°34'32.6"W (TTU-M 151242–151253); 12, 34°22'34.1"N, 101°34'24.7"W (TTU-M 151254–151265).

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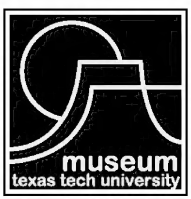

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